

TECH OFFER

Hybrid Photocatalytic Film with Enhanced Antibacterial and Antiviral Properties



KEY INFORMATION

TECHNOLOGY CATEGORY:

Materials - Composites

Chemicals - Coatings & Paints

Environment, Clean Air & Water - Sanitisation

Green Building - Indoor Environment Quality

TECHNOLOGY READINESS LEVEL (TRL): **TRL9**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO175306**

OVERVIEW

In recent years, particularly after the pandemic, the demand for effective antibacterial and antiviral solutions has surged. These solutions are increasingly utilized in diverse settings, including residential spaces, educational institutions, public areas, and transportation systems. Thus, it is anticipated that the demand for antimicrobial and antiviral products will continue to grow.

Despite their utility, traditional antimicrobial and antiviral technologies have notable limitations. Copper, for example, offers a strong immediate antimicrobial effect but suffers from reduced durability due to oxidation and is effective only within a limited range. Silver ions are more durable and applicable to a wider range of surfaces but lack the immediate efficacy of copper. Photocatalysts, while more durable than both copper and silver, are heavily dependent on the availability of a suitable light source. These challenges underscore the need for a technology that is fast-acting, durable, and versatile across various environments.

To address these challenges, the technology owner has developed a hybrid photocatalytic film with enhanced antibacterial and antiviral properties. This solution combines the photocatalytic activity of copper suboxide and titanium dioxide with visible light responsiveness to effectively denature membrane proteins on virus surfaces, thereby reducing their infectivity. Additionally, the technology incorporates a film-based manufacturing process, providing a more efficient alternative to traditional paint-based approaches.

The technology owner is actively seeking R&D collaborations and licensing opportunities with industry partners interested in implementing this film in various applications.

TECHNOLOGY FEATURES & SPECIFICATIONS

The technical features and specifications are listed as follows:

- **Dual Antiviral Effects:** Antibacterial effect by copper suboxide and photocatalytic effect by visible light of copper suboxide-supported carrier (titanium dioxide)
- **Reduces Infectivity:** Denatures membrane proteins on virus surfaces, significantly lowering their infectivity
- **Visible Light Activation:** Functions effectively under visible light (including ultraviolet rays), ensuring antiviral performance even indoors
- **Superior Performance:** Provides immediate antiviral effects and exceptional durability, outperforming traditional technologies
- **Transparent Design:** A thin film preserves the original appearance of the underlying material
- **Shorter Construction Time:** It eliminates the need for on-site formulation, curing, odor control, drying, and coating management of paints
- **Versatile Application:** Compatible with a wide range of substrates, enabling broad use across various settings

POTENTIAL APPLICATIONS

This film is designed for a wide range of products and applications, particularly those requiring high hygiene requirements. Key applications include:

- **Home Appliances:** Lighting fixtures, ventilation fans, furniture, and other household equipment
- **Public Spaces:** Frequently touched surfaces such as elevator buttons, door handles, etc.
- **Medical and Healthcare Facilities:** Hospital trays, walkers, toilet handles, etc.

UNIQUE VALUE PROPOSITION

- **Effective in Light and Darkness:** Suppresses bacteria and viruses even in the absence of light
- **Continuous Hygiene Maintenance:** Keeps surfaces consistently hygienic, reducing the need for frequent cleaning with alcohol and other disinfectants
- **Aesthetic Preservation:** Retains the original appearance and design of the surface or space where it is applied